United States
Environmental Protection
Agency

EPA Proposes Plan for Contaminated Ground Water

Tomah Municipal Sanitary Landfill
Tomah, Wisconsin June 2003

Share your opinions

EPA invites your comments on its recommended plan for contaminated ground water. Your input helps EPA determine the best course of action. You may fill out and return the enclosed form, or e-mail or fax your comments to EPA community involvement coordinator Bri Bill using the contact information on Page 5.

Your comments must be postmarked by the last day in the comment period:

Public comment period
June 10 - July 10, 2003

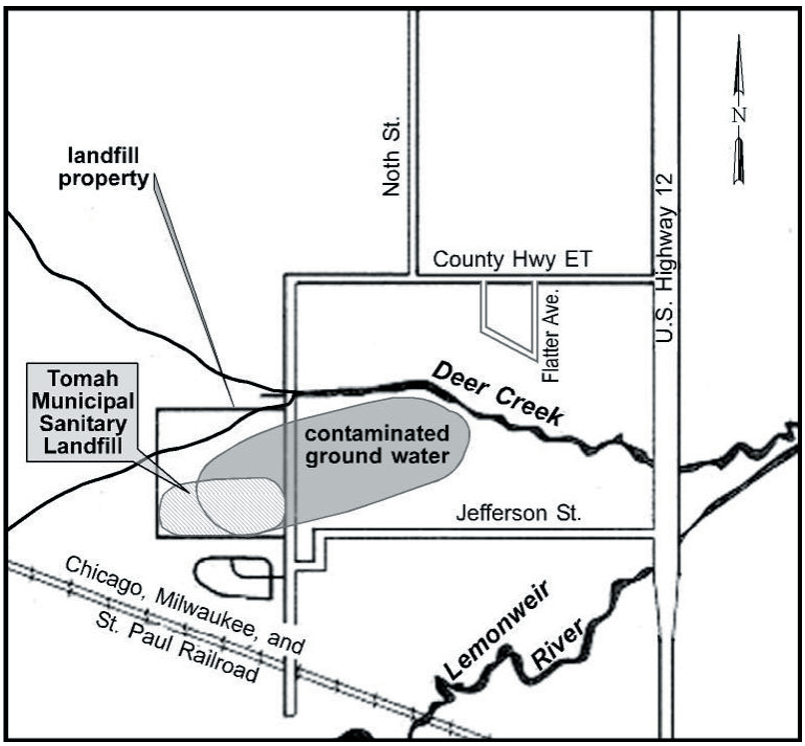
You may also share your views by attending an EPA open house and public meeting. The open house will give you an opportunity to meet informally with EPA and state and local officials, ask questions and view maps of the project.

During the meeting, EPA will give a presentation to explain the recommended plan for ground water and take questions. The meeting will end with an opportunity for you to speak for the public record. A court reporter will record the meeting. You may also submit written comments at the open house or the meeting:

Tuesday, June 24, 2003
Tomah City Hall
Council Chambers
819 Superior Ave.

Open house 6:00 - 7:00 p.m.
Meeting 7:00 p.m.

If you require special accommodations to attend these meetings, please contact Bri Bill two weeks prior.



Ground water contaminated by a Tomah landfill will be cleaned by natural processes under a plan proposed by U.S. Environmental Protection Agency. Ground water will be tested regularly and deed restrictions put in place to prevent the use of ground water in the contaminated area. Water and sediment (creek mud) in Deer Creek will also be tested.

This proposal, called monitored natural attenuation, is one of five EPA considered for cleaning ground water contaminated by past leaks at the Tomah Municipal Sanitary Landfill on Noth Street. This approach protects human health and the environment and is the least expensive of the acceptable options. Wisconsin departments of Natural Resources and Health and Family Services are assisting EPA in the project.

Tomah residents have 30 days to comment on EPA's proposed plan. See the box to find out how.[1] Based on public comments, EPA may modify the proposal or select another.

A report from April 2003 gives details of what is known about the contaminated ground water. This report, titled the Operable Unit 2 Feasibility Study, also provides detailed information about the cleanup alternatives. The report is available at the Tomah Public Library.

[1] *Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act requires that EPA provide an opportunity for a public meeting and hold a comment period. It also requires a newspaper ad announcing the proposed plan and a brief analysis. This mailer summarizes the feasibility study and information detailed in other site-related reports available in the administrative record at the Tomah Public Library and at the EPA office in Chicago. EPA placed this site on the Superfund National Priorities List in 1989.*

Risks to people and the environment

Risk from the Tomah landfill is primarily to people who drink, bathe or shower with ground water containing chemicals at high levels. EPA estimates that if 100 adults were to drink contaminated water at levels present in the ground water at the landfill over a 70-year lifetime, as many as three could develop cancer. The study also showed other health effects if people drank or used contaminated water at levels found there.

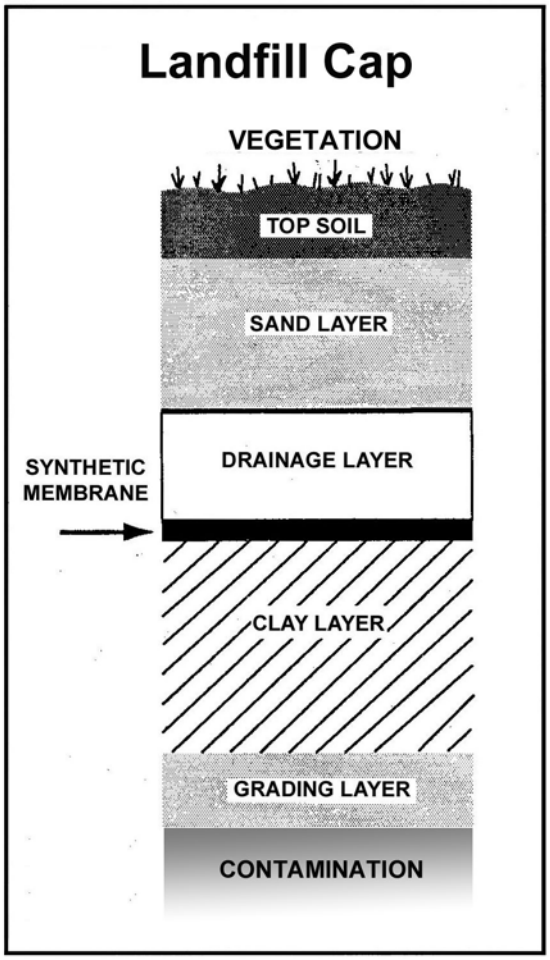
To prevent contact with chemicals in ground water, the city extended water lines in 1993 to homes in the Sunnyvale subdivision south of the site. Plans are underway to extend water lines to homes on Flatter Avenue, which lie in the direction contaminated ground water is moving. City water will ensure clean water for the future.

Harm to the environment at Deer Creek and adjacent wetlands could occur if contaminated ground water reaches these areas. A 1994-95 investigation of a portion of Deer Creek nearest the landfill showed the creek was free of landfill chemicals. However, the proximity of contaminated ground water to the portion of the creek southwest of Flatter Avenue suggests to EPA that monitoring of the creek will be necessary.

About the Tomah Municipal Sanitary Landfill site

The former Tomah landfill on Noth Street and the property on which it lies make up the Tomah Municipal Sanitary Landfill site. The landfill accepted municipal and industrial waste for 20 years until 1979, when it was closed due to concern for ground-water quality. Unlike today's landfill disposal practices, waste at this landfill was placed in shallow, unlined trenches and covered with soil. Chemicals leaked into underlying soil and ground water, and harmful and explosive landfill gases migrated toward nearby homes through openings in waste and soil.

Workers lay piping for the landfill's gas extraction system.



In 2000, EPA oversaw construction of a landfill cap made of a thick synthetic membrane and several feet of clay. The cap was finished off with topsoil and vegetation. The cap prevents water from mixing with the waste and slows contaminant movement. In addition, a gas extraction system was completed to safely vent landfill gases into the air. Preliminary tests suggest these measures are working.

About the ground-water contamination

EPA is also concerned with the ground-water contamination caused by the landfill that lies under private property to the northeast of the landfill.

Over time, chemicals from waste disposed at the Tomah landfill leaked into the ground water underneath the landfill. While the landfill cap installed in 2000 helps to slow or stop new leaking, it does nothing to clean ground water already contaminated. Ground water in the landfill area is moving slowly to the northeast, carrying contaminants with it. While many contaminants in the ground water have been found, most are at safe levels. Several contaminants EPA remains concerned about are called volatile organic compounds. VOCs are a group of chemicals used in solvents, degreasers, paints, thinners and fuels. They can pose a health risk to people who drink contaminated water or breathe vapors released in a shower.

Contractors for city of Tomah and International Paper -- parties EPA holds responsible for the cleanup -- have conducted ground-water studies for nearly three years. Under EPA supervision, they have collected ground-water samples from monitoring wells within and around the contaminated area (called the plume) and nearby residential wells. They analyzed these samples in a lab. In 2002, they also drilled and collected water from eight temporary boreholes located in the area of contaminated ground water. This was done to better define its horizontal and vertical limits. In all, 200 samples were collected and evaluated. In addition, they have collected samples from residential wells in homes near the landfill.

These studies help to define the limits, flow direction and chemical makeup of the ground water and study how well natural processes are working to clean ground water.

Results show that the size and limits of the contaminated area haven't changed much. However, an area of deep ground water 400 feet northeast of the landfill was discovered that has high levels of vinyl chloride. Scientists know that vinyl chloride is formed when natural processes in ground water break down other VOCs. While vinyl chloride can be a harmful chemical, its presence shows that natural processes are cleaning the ground water near the Tomah landfill. As ground water flows into more oxygen-rich areas, EPA expects vinyl chloride to break down. Besides vinyl chloride, other VOCs found at levels above or near federal and state drinking water guidelines include benzene, tetrachloroethene and cis-1,2-dichloroethene. It will be necessary to continue ground-water testing to check for harmful levels.

Because the contaminated ground water is near Deer Creek, testing of the creek itself will be necessary in the future.

The studies summarized here are described in detail in the feasibility study. Previous studies that contribute to EPA's understanding of the ground-water contamination are explained in documents contained in site files available for review at the library (see Page 5).

Cleanup options

EPA considered five options for managing and cleaning up contaminated ground water. EPA evaluated each option against nine criteria required by law. The alternatives are explained below. The feasibility study completed in April 2003 provides more detail.

No further action: Nothing would be done to manage, monitor or clean up the ground-water contamination. EPA always includes "no further action" as an alternative. Cost is $0.

Monitored natural attenuation: *This is the alternative proposed by EPA.* This option relies on natural processes to clean up or attenuate contaminants in the ground water. Ground water would also be routinely tested to make sure natural processes are working well. More wells would be added to the current monitoring well network, and some would be removed. A new monitoring plan would be developed after EPA makes its final cleanup decision. Water and sediment in Deer Creek would be tested to find out if contamination in ground water is entering the creek.

In addition, deed restrictions would be put in place to prevent installation of new wells in contaminated areas. City water lines are already being extended to homes on Flatter Avenue. EPA doesn't know if contaminated water will reach drinking water wells on this street. Connection is a precaution since homes lie in the direction that contaminated ground water is moving. If, over time, the monitoring program reveals that natural processes are not working as expected, EPA would consider adding another cleanup option.

There are no startup or capital costs beyond making changes to the ground-water monitoring program in place now. Costs include those for installing new wells, maintaining them, collecting samples, lab expenses and administering the program. Cleanup goals would likely be met in 40 to 50 years. Estimated cost is $633,000.

Oxygen enhancement using a slow-release oxygen compound: This option is similar to the monitored natural attenuation option, except that oxygen would be injected into the

How do natural processes clean ground water?

In a process EPA refers to as *natural attenuation*, chemical, biological and physical interactions natural in the environment clean chemicals in ground water. EPA believes two main natural processes are at work in the Tomah ground water.

During *biodegradation*, microbes that live in the ground water use some chemicals for food. Over time, digestion changes these chemicals into water and harmless compounds.

Dilution also helps to clean water. As pollution moves through ground water, it mixes with clean water. This mixing reduces contamination to harmless levels.

Natural attenuation occurs at most sites if the right conditions exist underground. It works best where the source of contaminants has been removed or contained - say by a landfill cap as at the Tomah site. Depending on the site, it may work just as well and almost as fast as other cleanup methods. Because it takes place underground, digging and construction are not needed and there is no waste to dispose of. It is less disruptive to nearby residents and requires less equipment and labor than most methods. Therefore, it is usually cheaper. Monitoring for years can be costly, but it typically still costs less than other, more active, cleanup methods.

ground to speed up natural processes at the front of the contamination. About 50 wells would be installed into the area of highest ground-water contamination. An oxygen compound would be injected into the ground water once or twice a year, likely for six years.

Oxygen enhancement would be difficult to do at this site because of the number of injection points required, wet terrain, effect on residential properties and regulations that protect wetlands. If successful, the oxygen treatment in combination with natural processes would slow or prevent ground-water contamination from moving forward. However, cleanup goals would likely still only be met in 40 to 50 years. Estimated cost is $3,037,000.

Oxygen enhancement using biosparging: As in the previous option, oxygen would be injected into the ground over a period of six years. Forty wells would be installed into the area of highest ground-water contamination. With this option, oxygen would be generated from equipment housed in a small building and forced by high pressure into trenches leading to wells.

This option is difficult for the reasons stated above. Cleanup goals would likely be met in 40 to 50 years. Estimated cost is $2,135,000.

Ground-water pump and treat: This option builds on the monitored natural attenuation option with the installation of two or three large-diameter wells into areas of highest ground-water contamination. Water would be pumped from the ground, and routed to a building near the pumping wells where it would be treated to safe levels and emptied into Deer Creek.

Crews install a well to test ground water.

Pump and treat is difficult to do at this site because of the need to lease residential property, the nature of the terrain and regulations that protect wetlands. Cleanup goals would likely be met within 40 years. Estimated cost is $2,642,000.

Evaluation criteria

EPA uses nine criteria to compare and evaluate cleanup options:

1. Overall protection of human health and the environment addresses whether an alternative adequately protects both human health and the environment. This criterion can be met by reducing or eliminating contaminants, or by reducing exposures to them.

2. Compliance with applicable or relevant and appropriate requirements, known as ARARs, assures that each project complies with federal, state and local laws and regulations.

3. Long-term effectiveness and permanence evaluates how well an option will work in the long term, including how safely remaining contaminants can be managed.

4. Reduction of toxicity, mobility or volume through treatment addresses how well the option reduces the toxicity, movement and amount of contaminants.

5. Short-term effectiveness is how quickly the project achieves protection, as well as its potential to be harmful to human health and the environment while it's being constructed and operating.

6. Implementability addresses how well the alternative can be implemented. It evaluates the technical feasibility and whether materials and services are available to carry out the project.

7. Cost includes estimated capital or startup costs, such as the cost of buildings, treatment systems and monitoring wells. The criterion also considers costs to implement the remedy and operate and maintain it over time. Examples include laboratory analysis and personnel to operate equipment.

8. State acceptance is whether the state environmental agency, in this case Wisconsin DNR, agrees or disagrees with EPA's recommended alternative. EPA evaluates state acceptance after it receives and evaluates public comments on its recommended alternative.

9. Community acceptance evaluates how well the community near the site accepts the option. EPA evaluates community acceptance after it receives and evaluates public comments on its recommended alternative.

Evaluation of clean up options against EPA's nine criteria

Evaluation Criteria	No Further Action	Monitored Natural Attenuation	Oxygen Enhancement Using Oxygen Compound	Oxygen Enhancement Using Biosparging	Ground-water Pump and Treat
Overall Protection of Human Health and the Environment	◧	■	■	■	■
Compliance with ARARs	not applicable	■	■	■	■
Long-Term Effectiveness and Permanence	◧	■	■	■	■
Reduction of Toxicity, Mobility or Volume through Treatment	□	□	■	■	■
Short-Term Effectiveness	■	◧	◧	◧	◧
Implementability	■	■	□	□	□
Total Cost	$0	$633,000	$3,037,000	$2,135,000	$2,642,000
State Acceptance	Will be evaluated after the public comment period.				
Community Acceptance	Will be evaluated after the public comment period.				

■ Meets Criteria ◧ Partially Meets Criteria □ Does Not Meet Criteria

How do the options compare?

Once contaminated, ground water is extremely difficult, if not impossible, to clean up. To protect human health, the city has either provided or offered municipal water to all homes that lie in the direction of contamination.

All options would likely clean water in 40 - 50 years but monitored natural attenuation is easier to implement and is $1.5 to $2.5 million less expensive than the three other options presented in this plan. The wetlands and privately-owned property that lies over the contaminated ground water present substantial obstacles to installing numerous wells, building structures or maintaining equipment required by the oxygen treatment and ground-water pump and treat options.

EPA believes that monitored natural attenuation, along with deed restrictions, municipal water hook-ups, a landfill cap installed in 2000 and testing of Deer Creek, offers the best balance in terms of the effectiveness, feasibility and cost.

To learn more

If you would like to learn more about EPA's recommended option or the Tomah landfill site, please look at the site files in the Tomah library or contact a member of the cleanup team listed below. Or, check out EPA's web site at epa.gov/region5/sites/tomah

Tomah Public Library
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Environmental Protection
Agency

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Chicago, IL 60604

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RETURN SERVICE REQUESTED

TOMAH MUNICIPAL SANITARY LANDFILL: EPA Proposes Plan for Contaminated Ground Water

This fact sheet is printed on paper made of recycled fibers.

Next steps

EPA will consider all public comments submitted during the comment period before choosing a final plan for contaminated ground water. EPA will provide a written response to comments in its final cleanup decision, called a record of decision. EPA will announce the decision in a newspaper ad in local newspapers.

EPA wants to hear from you!

Ground water contaminated as a result of past operations at the Tomah Municipal Sanitary Landfill on Noth Street will be cleaned by natural processes under a plan proposed by U.S. Environmental Protection Agency. The plan also includes ground-water monitoring, deed restrictions to prevent the use of ground water in affected areas and testing of Deer Creek.

Residents are invited to send or e-mail written comments during a public comment period:

June 10 - July 10, 2003

Or, you may learn more about the project and share your views at an EPA open house and meeting:

Tuesday, June 24, 2003
Tomah City Hall
Council Chambers
819 Superior Ave.

Open house: 6:00 - 7:00 p.m.
Presentation and meeting: 7:00 p.m.

Read inside to learn more!